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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/719,504	11/21/2003	Terry R. Galloway	039592-0012000	3010

22204 7590 02/07/2006

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EXAMINER	
LEWIS, BEN	

ART UNIT	PAPER NUMBER
1745	

DATE MAILED: 02/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/719,504	GALLOWAY, TERRY R.	
	Examiner	Art Unit	
	Ben Lewis	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-16 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-16 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 21 November 2003 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Detailed Action

1. The Applicant's amendment filed on December 1st, 2005 was received. Claims 1 and 6 were amended. Claims 17-31 were cancelled.

2. The text of those sections of Title 35, U.S.C. code not included in this action can be found in the prior Office Action (issued on October 6th, 2005).

Claim Rejections - 35 USC § 103

3. Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Galloway (U.S. Patent No. 6,187,465 B1) and Webster, Jr. et al. (U.S. Patent No. 6,086,722) and further in view of McIntosh et al (U.S. Patent No. 5,662,052)

With respect to claims 1,3 and 7, Galloway discloses a process and system for converting carbonaceous feedstocks into energy without greenhouse gas emissions wherein the process and system of the invention converts carbonaceous feedstock from fossil fuels and other combustible materials into energy without the production of unwanted greenhouse emissions. The present process comprises the following steps:

(a) converting a carbonaceous feedstock and a greenhouse gas stream in a gasification unit to synthesis gas comprising carbon monoxide and hydrogen;

(b) electrochemically oxidizing at least a portion of the synthesis gas from the gasification unit in a first half-cell of a fuel cell to produce a first half-cell exit gas comprising carbon dioxide and water;

(c) recovering the carbon dioxide from the first half-cell exit gas to serve as at least a portion of the greenhouse gas stream in step (a); and

(d) electrochemically reducing an oxygen-containing gas in a second half-cell of the fuel cell completing the circuit and resulting in the production of electrical energy (Col 2 lines 5-25).

Galloway does not specifically mention that the gasification unit is a non catalytic high temperature , gas phase reactor operating at conditions to achieve a gas exit temperature from at least 700^{0}C to about 1600^{0}C. However, Webster, Jr. et al disclose a process for minimizing evaporator scaling during recovery of liquids and solids from the aqueous effluent discharged during a partial oxidation gasification wherein the partial oxidation reaction is preferably carried out in a free-flow, unpacked non-catalytic gas generator, or gasifier at a temperature within the range of about 700^{0}C to about 2000^{0}C, preferably about 1200^{0}C to about 1500^{0}C (Col 3 lines 9-22). Therefore it would have been obvious to one of ordinary skill in the art to incorporate the non-catalytic gasifier of Webster, Jr. et al into the fuel cell system of Galloway because Webster, Jr. et al teach that under these conditions, about 98% to 99.9% of the hydrocarbonaceous feedstock can be converted to a synthesis gas containing carbon monoxide and hydrogen, also referred to as synthesis gas or syngas. Carbon dioxide and water are also formed in small amounts. The hydrocarbonaceous feedstock can be petroleum coke, coal, waste plastic material, sewage, or a suitable combination (Col 3 lines 9-22).

Galloway and Webster, Jr. et al discloses a process and system for converting carbonaceous feedstocks into energy above. However they do not specifically mention using a kiln having a solids outlet between the inlet means and the gas outlet means. However MacIntosh et al teach a method and system including a double rotary kiln pyrolysis for gasification of waste material wherein solid waste enters the inner kiln and is pyrolyzed to char. The char drops to the outer kiln where it is combusted with air to produce pyrolysis heat. Pyrolysis product in vapor form and combustion gas are removed separately from the reactor (Col 2 lines 41-53). The char particles present in the waste material and a flue gas is produced which exits through the gas conduits **29** and **48** while the ash and catalyst particles now substantially free of char exit the reactor **10** through the conduit **36** (Col 5 lines 57-67) (See Fig 1). Therefore it would have been obvious to one of ordinary skill in the art to use a kiln of MacIntosh et al with a solids outlet between the inlet and gas outlet in the gasification system of Galloway and Webster, Jr. et al because MacIntosh et al teach that the char particles present in the waste material and a flue gas is produced which exits through the gas conduits **29** and **48** while the ash and catalyst particles now substantially free of char exit the reactor **10** through the conduit **36** (Col 5 lines 57-67) (See Fig 1).

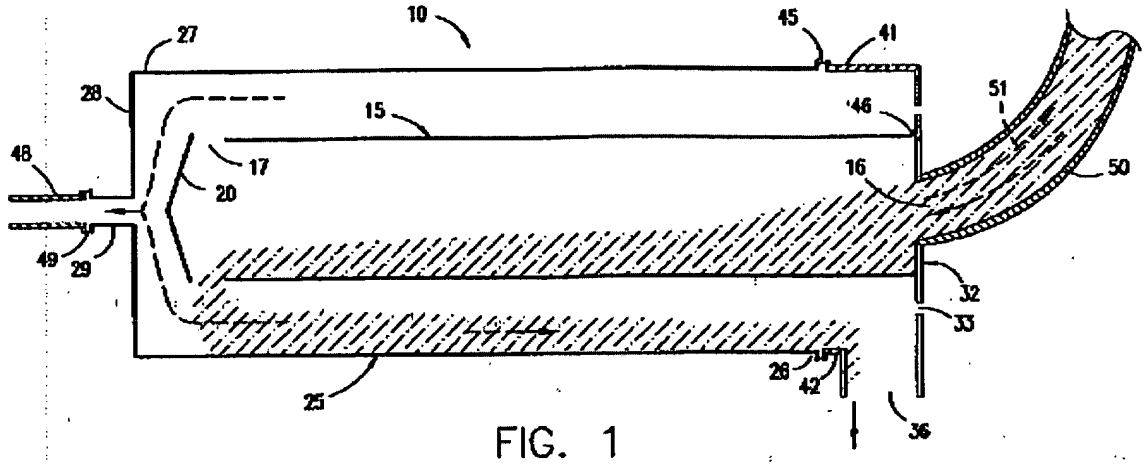

FIG. 1

With respect to claim 2, Galloway teach that the present process comprises the following step:

(a) converting a carbonaceous feedstock and a greenhouse gas stream in a gasification unit to synthesis gas comprising carbon monoxide and hydrogen (Col 2 lines 5-25).

With respect to claims 4 and 5, Galloway teach that the process can be used in an electric power producing plant using fossil fuels such as carbonaceous feedstocks including coal, hydrocarbon oil, natural gas, oil shale, and petroleum coke as well as in petroleum refinery and a petrochemical plants (Col 3 lines 35-44).

With respect to claim 6, Galloway teach that the second embodiment also uses a rotary waste feeder steam-reforming system where superheated steam and hydrogen react with organic waste to form syngas plus light hydrocarbons. This gas output from

the rotary feeder is sent to the high temperature steam reformer where fairly pure "balanced" syngas is produced.

With respect to claims 8, 10 and 11, Galloway teach that by means of the present process and system, the carbon dioxide in the fuel cell is easily kept separate from the air side and any nitrogen. This carbon dioxide can be recycled back to the gasifier in nearly pure form. Likewise water in pure form can be recycled as well in different amounts under gasifier control system requirements to maintain the ideal hydrogen to carbon monoxide ratio of in the range of about 1.75 to about 2.25. This helps maintain a high hydrogen content in the gasifier so that the gasifier-produced syngas can be used downstream in a chemical reactor such as a Fischer-Tropsch reaction system for the production of a variety of useful chemicals ranging from methanol to paraffin waxes (Col 3 lines 9-28).

With respect to claim 9, Galloway teach that the oxidized syngas, consisting essentially of hydrogen and carbon monoxide, leaves anode **42** of fuel cell **26** mostly as water vapor and carbon dioxide. This stream of oxidized syngas passes via line **48** into air-cooled condenser **50**, where the water vapor is condensed into liquid water and is removed from the condenser bottoms via line **52** for reuse (Col 4 lines 56-67).

With respect to claim 12, Galloway teach that the process of claim 8 wherein the amount of greenhouse gas stream is adjusted in step (a) so that the combined

carbonaceous feedstock and greenhouse gas stream to said gasification unit has a hydrogen to carbon monoxide ratio in the range of about 1.75 to about 2.25 (See Galloway Claim 12).

With respect to claim 13, Galloway teach that the process of claim 1 wherein the oxygen-containing gas in step (d) is air and the nitrogen that remains after the electrical reduction is exited into the atmosphere (See Galloway Claim 13).

With respect to claim 14, Galloway teach that the process of claim 1 wherein said first half-cell of said fuel cell contains an electrolyte surrounding a porous catalytic anode electrode (See Galloway Claim 14).

With respect to claim 15, Galloway teach that the process of claim 14 wherein said second half-cell of said fuel cell contains an air electrolyte surrounding a catalytic cathode electrode (See Galloway Claim 15).

With respect to claim 16, Galloway teach that the process of claim 15 wherein said first and second half-cells of said fuel cell are separated by an ionically conducting membrane that will not allow passage of components from the respective half-cells (See Galloway Claim 16)

4. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Galloway (U.S. Patent No. 6,187,465 B1).

With regards to claim 5, Galloway discloses a process and system for converting carbonaceous feedstocks into energy without greenhouse gas emissions wherein the process and system of the invention converts carbonaceous feedstock from fossil fuels and other combustible materials into energy without the production of unwanted greenhouse emissions. The present process comprises the following steps:

(a) converting a carbonaceous feedstock and a greenhouse gas stream in a gasification unit to synthesis gas comprising carbon monoxide and hydrogen;

(b) electrochemically oxidizing at least a portion of the synthesis gas from the gasification unit in a first half-cell of a fuel cell to produce a first half-cell exit gas comprising carbon dioxide and water;

(c) recovering the carbon dioxide from the first half-cell exit gas to serve as at least a portion of the greenhouse gas stream in step (a); and

(d) electrochemically reducing an oxygen-containing gas in a second half-cell of the fuel cell completing the circuit and resulting in the production of electrical energy (Col 2 lines 5-25).

Galloway does not disclose a rotary kiln, but teach that that the second embodiment also uses a rotary waste feeder steam-reforming system where superheated steam and hydrogen react with organic waste to form syngas plus light hydrocarbons. This gas output from the rotary feeder is sent to the high temperature steam reformer where fairly pure "balanced" syngas is produced (Col 5 lines 41-59). A rotary waste feeder steam-

reforming system and a rotary kiln are considered functionally equivalent waste feed reforming systems. Therefore, it would have been obvious to one of ordinary skill in the art to substitute a rotary kiln for the rotary waste feeder steam reforming system in the fuel cell system disclosed by Galloway.

Response to Arguments

5. Applicant's arguments filed on December 1st, 2005 have been fully considered but they are not persuasive.

Applicant's principle arguments are

(a) Claim 1 has now been amended to substitute the term "reactor" with the following phrase: "kiln having an inlet means, a gas outlet means, and a solids outlet between the inlet means and the gas outlet means." The latter phrase is found in the Summary of the invention section on page 4 lines 7-9 of the specification. By including this phrase in claim 1, the Applicant believes that all of the claims pending in the case are patentable over the prior art

In response to Applicant's arguments, please consider the following comments.

(a) Galloway and Webster, Jr. et al discloses a process and system for converting carbonaceous feedstocks into energy above. However they do not specifically mention

using a kiln having with a solids outlet between the inlet menas and the gas outlet means. However MacIntosh et al teach a method and system including a double rotary kiln pyrolysis for gasification of waste material wherein solid waste enters the inner kiln and is pyrolyzed to char. The char drops to the outer kiln where it is combusted with air to produce pyrolysis heat. Pyrolysis product in vapor form and combustion gas are removed separately from the reactor (Col 2 lines 41-53). The char particles present in the waste material and a flue gas is produced which exits through the gas conduits **29** and **48** while the ash and catalyst particles now substantially free of char exit the reactor **10** through the conduit **36** (Col 5 lines 57-67) (See Fig 1). Therefore it would have been obvious to one of ordinary skill in the art to use a kiln of MacIntosh et al with a solids outlet between the inlet and gas outlet in the gasification system of Galloway and Webster, Jr. et al because MacIntosh et al teach that the char particles present in the waste material and a flue gas produced exits through the gas conduits **29** and **48** while the ash and catalyst particles now substantially free of char exit the reactor **10** through the conduit **36** (Col 5 lines 57-67) (See Fig 1). (Conduit 36 is between the inlet and gas outlet of the kiln).

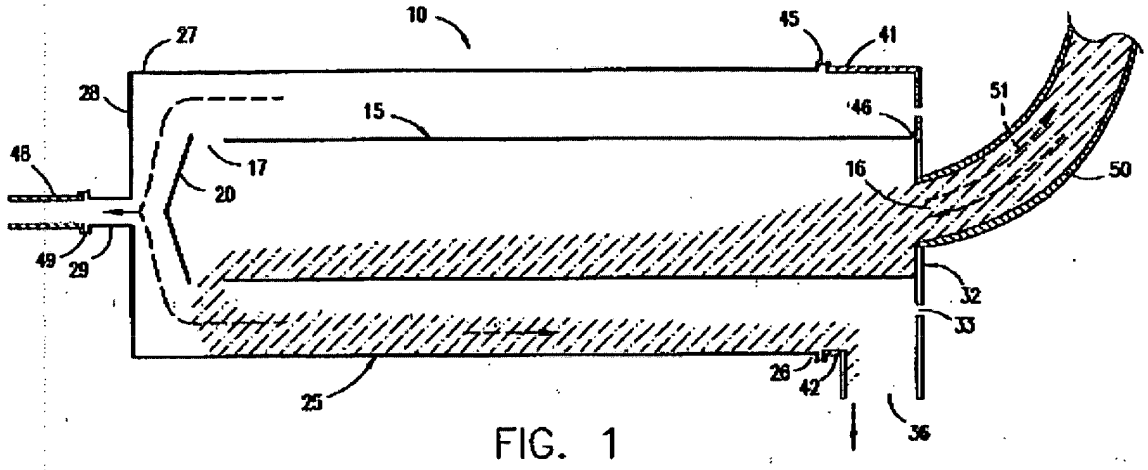

FIG. 1

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Ben Lewis

PATRICK JOSEPH RYAN
SUPERVISORY PATENT EXAMINER

Patent Examiner

Art Unit 1745